جامعة طنطا
كلية الهندسة
قسم الالكترونات والاتصالات الكهربية

المادة / ادارة المشروعات
(EEC41H5)
الفرقة الرابعة (لائحة جديدة)

بسم الله الرحمن الرحيم
التاريخ : 2009 /1/29
الزمن : ساعتان

أجب عن الأسئلة الآتية:- (40 درجة)

السؤال الأول:-

1- الجدوى التسويقية هى إحدى مكونات دراسة الجدوى الاقتصادية - تكلم باختصار عن الجدوى التسويقية.
2- تكلم بالتفصيل عن عناصر التصنيع.

السؤال الثانى:-

1- يمكن تقسيم المصنع على حسب طرق عمليات الانتاج والتخطيط الى ثلاثة أقسام رئيسية اكتب نبذة مختصرة عن هذه الأقسام.
2- تكلم عن أهم:-
(أ)- العوامل المؤثرة فى حجم مرونة الطلب.
(ب)- العوامل التى يترتب عليها نقصان أو زيادة العرض.

3- ما المقصود بكل من :-
1- شركة التضامن
2- الشركة المساهمة
مع شرح لأهم مزايا وعيوب كل نوع.

السؤال الثالث:-

1- المقصود ب المخزون - ولماذا نحتفظ بالمخزون؟
2- ما المقصود بالجودة - اشرح باختصار مراحل تطور الرقابة على الجودة .

مع أطيب التمنيات بالنجاح
أ.د/عبد الفتاح مصطفى خورشد

Tanta University Faculty of Engineering Dept. of Electrical Communications Eng.	4th Year Satellite Communications System Time Allowed: 3 Hours

Answer the following questions:

1- (a) Derive an expression for the free space path loss in dB?
(b) Discuss the interference between the satellite communications and microwave links?
(c) An earth station has a 100 W transmitter, 50% waveguide losses to the antenna, and an antenna gain ratio of 2000:1. Calculate the earth station EIRP and the received power by an isotropic antenna at a distance of 10000 km where the transmitted frequency is 12 GHz.

2- (a) Compare between the different communications satellite orbits?
(b) Describe the satellite-Earth station geometry and write down the equations which determine the azimuth and elevation angles?
(c) Discuss the effects of the noncircular cross section of the earth on the satellite longitude?

3- (a) Discuss the different techniques used in frequency reuse for the satellite communications?
(b) Explain with sketches the effect of rain drops on the linear polarization?
(c) What are the main three reasons that cause the cross polarization?

4- (a) For a parabolic reflector antenna, write an expression for the gain in dBi as a function of the antenna diameter in meter, frequency in GHz?
(b) Describe with sketch the offset parabolic antenna?
(c) Discuss the sources in interference in satellite systems?

5- (a) Describe with sketch the travelling wave tube amplifier (TWT) and discuss its characteristics and its effects on the FDMA and TDMA signals?
(b) Figure 1 shows a poor rainy conditions where a heavy rain with a rate of 150 mm/h which affects both the microwave and satellite links. The distance between the two microwave stations was 30 km. The ground station receives the signal from a geostationary satellite of 30 Deg. East longitude while the longitude and latitude of the earth station were 70 Deg. East and 40 Deg. North respectively. The rain height was 4 km and the clouds body (3 km thickness) can be considered as the same as the rain environment. Find and compare between the signal loss in each system if the used frequency was 30 GHz?

Hint: Use the attenuation coefficients in Figure 2.

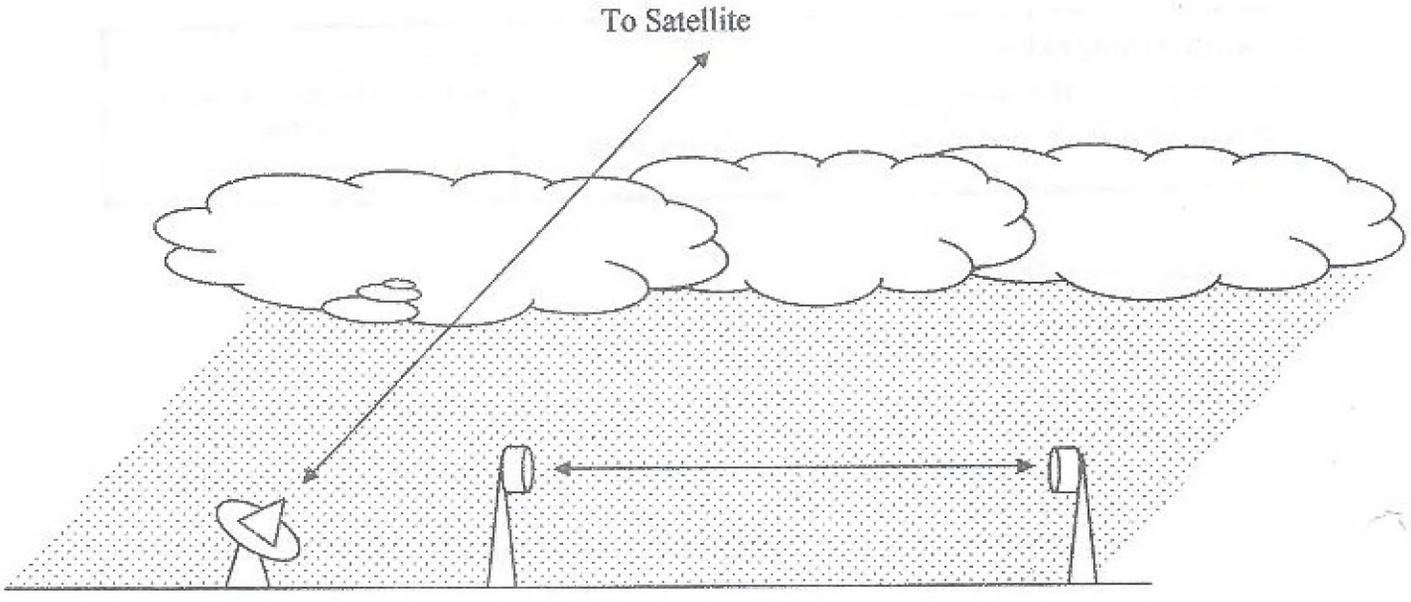
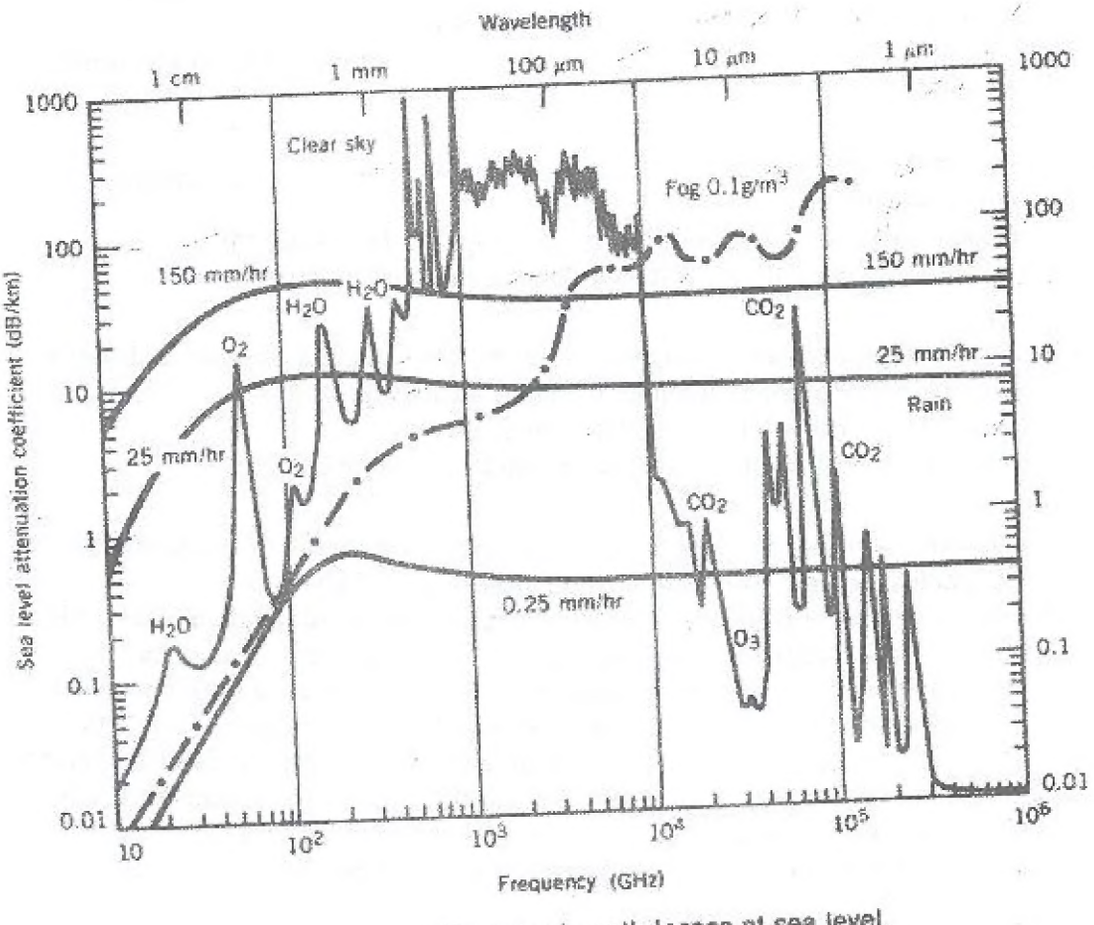


Figure 1



Atmospheric path losses at sea level.

Figure 2

With Best Wishes

TANTA UNIVERSITY
FACULTY OFENGINEERING
ELECTRONICS&COMMUNICATIONS DEP.

JANUARY 2009
TIME ALLOWED: 3 HOURS
4th YEAR COMMUNICATION

FINAL EXAMINATION
SUBJECT: ANTENNAS &WAVE PROPAGATION

Attempt all questions:

1- a- Write down **short notes** about:
i- The main antenna parameters. ii- Advantages of aperture antennas over wire antennas.
iii- Objectives achieved by the antenna arrays.

b- Write down an expression for the array factor of a linear uniform array consisting of N elements. For a large **endfire array**, derive the needed condition to avoid the presence of grating lobes and the limiting value of the peak-side lobe to main lobe ratio as N increases to a very large value. Estimate the array directivity and beam width considering isotropic elements .

c- Design an **endfire array** such that no grating lobes exist in the resultant pattern and the peak-side lobe to main lobe ratio is less than **-12.4 dB** with minimum number of elements and maximum spacing. Plot the corresponding array factor and approximately estimate the beam width. If the array is along the Z-axis and the elements are short dipoles oriented to Y-direction. Plot the resultant pattern in the X-Y and Y-Z planes.

2- a- Write down an expression for the array factor of the **non-uniform linear array** with symmetric feeding in the case of odd number of elements.

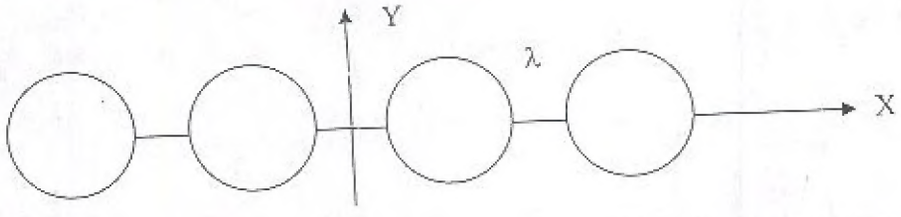
b- For a **9 elements Binomial endfire array** consisting of short dipoles placed on Z-axis that oriented towards the X-axis and separated by λ/2 spacing:
i- Estimate the elements relative feeding coefficients
ii- Plot the array factor as well as the total field pattern in the Z-X and Y-X planes

c- For a **6x4 elements** (short dipoles oriented to Z-axis) **planar array** placed in the x-y plane with $d_x = d_y = \lambda/2$ and having the main lobe oriented towards ($\theta_o = 0^0$ *and* $\phi_0 = 30^0$)
Plot the array factor as well as the total field pattern in the Z-X , Z-Y and Y-X planes, then estimate the array gain in the x-y plane.

3- a- (1) Write down an expression for the array factor of a circular array placed in the X-Y plane , then, Estimate the **8 elements** phases(α_n) required to orient the main lobe to ($\theta_o = 30^0$ *and* $\phi_0 = 60^0$) if the radius of the array is 5λ .

(2) Sketch the principal pattern for a uniform feeding **8 elements** broadside circular array with a radius of 5λ in the x-y plane where the elements are short dipoles oriented towards Y-axis.

b) The shown arrangement represents a broadside array that consists of 4 uniformly illuminated circular apertures **each with radius** 2λ:
i- Estimate the radius and the 3-dB beam width of each element.
ii- Find and sketch the total field pattern in both E and H planes.



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4 a- **For the helical antenna** :

i- Describe the structure, properties and applications of helical antennas

ii- Investigate the differences between the axial and normal modes of operation.

iii-For the axial mode of operation write expression for the radiated pattern as well as the values of the optimum parameters.

iv- Design a 10 turns helical antenna operating at 2.4 GHz in the axial mode with circular polarization. Determine the circumference, the spacing, the axial ratio and pitch angle for near optimum design. Then calculate the input impedance, half-power beam width, directivity and VSWR if the antenna is connected to a 75-ohm coaxial line. Plot the far field pattern.

b- **For the microstrip antenna**:

i- Describe the structure, properties and applications.

ii-Write a general expression for the far field pattern, gain and radiation conductance assuming thin substrate.

iii- Evaluate the above parameters for a strip width of $w/\lambda = 0.1$ and $w/\lambda = 10$.

c- Determine and sketch the pattern of a vertically polarized radar antenna placed at a height of 2 λ above ground considering the antenna to have a side lobe free pencil beam pattern of 10^0 beam width and directed to 60^0 w.r.t ground.

الاتصالات ٤

Tanta University
Faculty of Engineering
Dept. of Electronics & Electrical Com.

Telecommunication Network
B. SC 1st-term Examination
Time Allowed: 3 Hour

Attempt with the following questions:

1- Compare between;
a- Duplication of a packet, and loosing a packet problems, on the packet switching network.
b- Functional availability, and operational availability of the communication network.
c- Effect of traffic overload on both the circuit and packet switching networks.
d- Set-up time in both in-channel and common channel signaling techniques.
e- Synchronous and Asynchronous transmission system. **[20]**

2- Explain briefly;
a- Variation of delay time with the message length,
b- The Exponential Forecasting Model is not an accurate forecasting model,
c- Twisted pair transmission media impairments.
d- Optical fiber cable has less attenuation than coaxial one **[16]**

3-a- Compare between Circuit switching and Virtual circuit packet switching techniques.
b- It is required to transfer a message with size 8500 bit from a source to destination with 3 nodes between them. The data rate for all links is 58 kbps. The packet size is 250 bits with 60 bit overhead. The call set-up time is 0.15 sec. The processing time at each node is 18 m sec., while the average queueing delay at each node is 0.03 sec, and the data speed over a link is 180 m/μ sec, and the hop distance is 60 km. Calculate the end-to-end delay time for the following cases;
a- Circuit Switching
b- Message Switching
c- Virtual circuit packet switching with delivery guaranteed using a mini packet of 70 bit. **[15]**

4-a-During the busy hour 4.46 Erlang is offered to an Exchange with 10 channels, each is occupied for 6 minutes on average. What is the probability of founding one channel free. How often will the congestion state occur during the busy hour, and calculate the length of the un-congestion period during the busy hour.
b- Calculate also for (a); the number of lost call trials during the busy hour, and the number of channels required to handle double this traffic with the same grade of service. Comment. **[15]**

5- On the busy hour, 18 calls are offered to a single channel delay system, each of 120 second duration. Calculate; 1- The probability that an arriving call is delayed
2- The average number of users that may be exist in the system.
3- The probability that there are more than 5 users in the system.
4- The probability that the delayed calls waiting time exceeds 5 minutes.
5- System improvement using 3 channels.
6- Average duration, and rate of the congestion state. **[24]**

Blocked-Calls-Cleared (Erlang *B*)

	A, erlangs												
	B												
N	1.0%	1.2%	1.5%	2%	3%	5%	7%	10%	15%	20%	30%	40%	50%
1	.0101	.0121	.0152	.0204	.0309	.0526	.0753	.111	.176	.250	.429	.667	1.00
2	.153	.168	.190	.223	.282	.381	.470	.595	.796	1.00	1.45	2.00	2.73
3	.455	.489	.535	.602	.715	.899	1.06	1.27	1.60	1.93	2.63	3.48	4.59
4	.869	.922	.992	1.09	1.26	1.52	1.75	2.05	2.50	2.95	3.89	5.02	6.50
5	1.36	1.43	1.52	1.66	1.88	2.22	2.50	2.88	3.45	4.01	5.19	6.60	8.44
6	1.91	2.00	2.11	2.28	2.54	2.96	3.30	3.76	4.44	5.11	6.51	8.19	10.4
7	2.50	2.60	2.74	2.94	3.25	3.74	4.14	4.67	5.46	6.23	7.86	9.80	12.4
8	3.13	3.25	3.40	3.63	3.99	4.54	5.00	5.60	6.50	7.37	9.21	11.4	14.3
9	3.78	3.92	4.09	4.34	4.75	5.37	5.88	6.55	7.55	8.52	10.6	13.0	16.3
10	4.46	4.61	4.81	5.08	5.53	6.22	6.78	7.51	8.62	9.68	12.0	14.7	18.3
11	5.16	5.32	5.54	5.84	6.33	7.08	7.69	8.49	9.69	10.9	13.3	16.3	20.3
12	5.88	6.05	6.29	6.61	7.14	7.95	8.61	9.47	10.8	12.0	14.7	18.0	22.2
13	6.61	6.80	7.05	7.40	7.97	8.83	9.54	10.5	11.9	13.2	16.1	19.6	24.2
14	7.35	7.56	7.82	8.20	8.80	9.73	10.5	11.5	13.0	14.4	17.5	21.2	26.2
15	8.11	8.33	8.61	9.01	9.65	10.6	11.4	12.5	14.1	15.6	18.9	22.9	28.2
16	8.88	9.11	9.41	9.83	10.5	11.5	12.4	13.5	15.2	16.8	20.3	24.5	30.2
17	9.66	9.89	10.2	10.7	11.4	12.5	13.4	14.5	16.3	18.0	21.7	26.2	32.2
18	10.4	10.7	11.0	11.5	12.2	13.4	14.3	15.5	17.4	19.2	23.1	27.8	34.2
19	11.2	11.5	11.8	12.3	13.1	14.3	15.3	16.6	18.5	20.4	24.5	29.5	36.2
20	12.0	12.3	12.7	13.2	14.0	15.2	16.3	17.6	19.6	21.6	25.9	31.2	38.2

٤ اتصالات مدنية ٢٠١١ مقرر اختياري (٣)

Tanta University **Faculty of Engineering** **Dept. of Electronics & Electrical** **Communications Eng.**	**4th Year** **Elective Cource (3)** **VLSI** **Time Allowed: 3 Hours**

<u>Answer 5 questions only:</u>

(1) a- Discuss with sketches the four-probe method for measuring the wafer resistance.

b- Compare between the zone refining and Czochralski methods.

c- Discuss with sketches the liquid phase epitaxy.

(2) a- Discuss with sketches the process sequence in negative photolithography.

b- Compare between the positive and negative photoresists.

c- Discuss with sketches the ion beam etching method.

(3) Choose the correct answer:

1- To fabricate depletion mode devices, one more masking step is needed for ....

a - ion implantation b - gate oxide c – drain d- source

2- The gate oxide thickness is generally ....

a - more than the field oxide b – less than the gate oxide c – equal to field oxide

3- The polysilicon layer is characterized by ....

a – light doping b – heavy silicon dioxide c – heavy doping d – high resistivity

4- The conductivity of the polysilicon layer is ....

a – very high b – very low c – infinity d – zero

5- In the fabrication of nMOS devices the p+ diffusion is done before ....

a – n+ diffusion b – thinox layer c – n-well regions d – forming polysilicon

6- The final mask for CMOS n-well process is done for ....

a – bonding pads b – metallization for drain c – metallization for source

7- The polysilicon layer is grown by ....

a – chemical vapor deposition b – single crystal withdrawal c – heating sio_2

8- After coating the wafer with photoresist, it is spun to ....

a – uniform its thickness b – remove SiO_2 layer c – increase its thickness

9- The color of the thinox in the stick diagram for nMOS process is ....

a – yellow b – green c – brown d – magenta

10- The minimum overlap length for gate and diffusion to have n-transistor is

a – 2 λ b – 1.93 λ c – 1.5 λ d – 1.725 λ

(4) a- State the lambda-based design rules for wires (nMOS and pMOS)

b- State the lambda-based design rules for contacts

c- Draw the stick diagram for 3-input NAND gate

(5) a- What are the required masks in the fabrication of nMOS transistor?

b- Draw the complementary transistors circuit diagram for:

1- C-switch 2- Multiplexer 3- Memory

(6) For the following function:

$$F = \overline{(A + B + D).C}$$

a- Construct the truth table.

b- Draw the complementary transistors circuit diagram.

c- Draw the stick diagram.

With Best Wishes